

Remarks

Further and favorable reconsideration is respectfully requested in view of the foregoing amendment and following remarks.

Thus, claim 25, the only claim remaining in the application, has been amended to recite an upper limit of 6% by weight of the silane coupling agent. This upper limit is disclosed on page 19, line 11 of the specification.

The patentability of the presently claimed invention, after entry of the foregoing amendment, over the disclosures of the references relied upon by the Examiner in rejecting the claims, will be apparent upon consideration of the following remarks.

Thus, the rejection of claim 25 under 35 U.S.C. §103(a) as being unpatentable over Havey et al. (US '163) is respectfully traversed.

The present invention is clearly distinguished from Havey et al. in that the heat-radiation-preventive coating material of the present invention does not contain **more than 6% by weight of a silane coupling agent**, whereas the composition of Havey et al. comprises **more than 10% by weight of silane compounds in total**.

According to Havey et al., the hydrolysis products and partial condensates of the epoxy functional silane and the tetrafunctional silane are present in the aqueous-organic solvent mixture in an amount of **from about 10 to about 99.9 weight percent, based on the total solids of the composition** (see column 4, lines 1 to 6 and column 23, lines 1 to 6).

Thus, the content of the silane compounds in the composition of Havey et al., based on the total solids of the composition, is **more than 10% by weight**.

In general, silanol groups are highly unstable in an aqueous solution, and the condensation reaction of silanol groups occurs with time, and gelation then occurs. When the silanol groups gelate to produce polysiloxane, it becomes difficult to form a Si-O-M bond with the surface of a glass, and the formation of a uniform and effective heat-radiation-preventive coating film on the glass becomes difficult. When the concentration of silanol groups dissolved in water is too high, the condensation reaction easily occurs to form a gel, which means that a uniform thin coating film can not be formed and a remarkable heat-radiation-preventive effect would not be obtained (see page 19 of the present specification). Therefore, it is necessary for the present invention to make the concentration of the silane coupling agent not more than 6% by weight.

As mentioned above, the composition of Havey et al. is entirely different from the water-based heat-radiation-preventive coating material for glasses used for the method of the present invention. In addition, Havey et al. do not teach anything about the method of preventing heat radiation from a glass which has absorbed solar-radiation heat. The reference only teaches coating the composition on a substrate for enhancing abrasion resistance.

Therefore, a person skilled in the art would not be led to select a composition comprising not more than 6% by weight of a silane coupling agent for preventing heat radiation from a glass, based on the teaching of Havey et al.

As for the experimental data in Applicant's previously submitted Declaration, the Examiner indicates that Experiment [2]-2 shows a mixture of 1% by weight of N-(β -aminoethyl) γ -aminopropyl triethoxy silane and 5% by weight of tetraethoxysilane, which is not the composition of Havey et al. since the total amount of the silane compounds is 6% by weight whereas the total amount of the silane compounds of Havey et al. is not less than 10% by weight.

However, even if the experiment is carried out in the same manner except for preparing the mixture so that the total amount of the silane compounds becomes 10% by weight or more in Experiment [2]-2, the result will be the same, i.e., the liquid phase of the mixture thus obtained will be separated, making it impossible to form a uniform solution.

In addition, with regard to the molar ratio of the epoxy functional silane and the tetrafunctional silane, which the Examiner regards as not clear whether the experiments satisfy this condition, Applicant submits that Experiment [2]-2 and Experiment [2]-3 do satisfy this condition.

Thus, according to Havey et al., the molar ratio of the epoxy functional silane and the tetrafunctional silane is from about 0.1:1 to about 5:1, which means that the amount of the epoxy functional silane is from 0.1 to 5 mol based on one mol of the tetrafunctional silane. Experiment [2]-2 and Experiment [2]-3 satisfy this condition as follows:

Experiment [2]-2:

- (A) N- (β -aminoethyl) γ -aminopropyl triethoxy silane (MW=264)
- (B) Tetraethoxysilane (MW=208.3)

(A): (B) = 1g/264:5g/208.3 = 0.0038mol:0.024mol = 1:6.3=0.159:1

Experiment [2]-3:

(A) 3-glycidoxypropyl-trimethoxysilane (MW=236.3)

(B) Tetraethoxysilane (MW=208.3)

(A): (B) = 1g/236.3:5g/208.3 = 0.0042mol:0.024mol = 1:5.7 = 0.175:1

Thus, the experimental data submitted by Declaration demonstrate the advantage of the present invention against Havey et al.

The rejection of claim 25 under 35 U.S.C. §102(b) or 35 U.S.C. §103(a) as being anticipated or suggested by Howes (US '862) is respectfully traversed.

The present invention is clearly distinguished from Howes in that the heat-radiation-preventive coating layer of the heat-radiation-preventive glass used for the method of the present invention is the outermost layer, whereas the organosilane ester mixture of Howes is used for an adherent material in order to adhere a glass sheet with a cured resin layer. The adherent coating formed of the organosilane ester mixture can not form an outermost layer of the glass sheet disclosed in the reference.

In this regard, the Examiner mentions that the adhered cured resin layer in Howes is not a coating but a molding. However, in view of the purpose of achieving the specific heat-radiation-preventive effect of the present invention, it does not make any difference whether the adhered cured resin layer is a coating or a molding. When another layer is formed on the heat-radiation-preventive coating layer of the glass, the heat-radiation-preventive effect can not be achieved even if the other layer is a molding.

As mentioned above, the adherent coating formed of the organosilane ester mixture can not form an outermost layer of the glass sheet disclosed in Howes. Moreover, the reference does not teach anything about a method of preventing heat radiation from a glass which has absorbed solar-radiation heat.

The rejection of claim 25 under 35 U.S.C. §102(b) or 35 U.S.C. §103(a) as being anticipated or suggested by Avery et al. (US '585) is respectfully traversed.

As Applicant has previously noted, this reference does not teach anything about a method of preventing heat radiation from a glass which has absorbed solar-radiation heat.

In this regard, the Examiner indicates that the composition in Avery et al. can be used to clean surfaces, for instance in the bathroom or kitchen (column 14, line 23), and that the skilled

artisan would have found the surface treatment of a window in the bathroom or kitchen to have been obvious.

However, Avery et al. only teach that the aqueous solutions can be used "...as water proofing agents when alkyl trimethoxysilanes are used, in cleaning compositions for bathrooms, kitchens, swimming pools, tiles, food areas and the like, ..." (see column 14, lines 21-24).

Avery et al. do not teach the surface treatment for windows of bathrooms or kitchens, but only teach cleaning compositions for a place contaminated by water stain or bacteria such as bathrooms, kitchens, swimming pools, tiles, food areas and the like. In general, cleaning compositions are washed away after treatment. Therefore, a skilled artisan would not have found it obvious to coat the composition on a window glass which has absorbed solar-radiation heat to form a permanent coating layer. The cleaning composition of Avery et al. is too far removed from the present invention to support such a suggestion.

For these reasons, Applicant takes the position that the presently claimed invention is clearly patentable over the applied references.

Therefore, in view of the foregoing amendment and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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